

REMARKS

Favorable reconsideration and allowance of this application are requested.

1. Discussion of Claim Amendments

Independent claim 1 has been revised so as to explicitly recite the Markush grouping of process ligands as originally defined by claim 16. As such, claim 16 has been canceled. Other clarifying revisions have been made to several of the dependent claims. For example, 15 has been amended so as to clarify that the second phosphine ligand is fed to the process together with the process ligand as ligand make-up. (See page 14, lines 3-5 of the originally filed specification.)

Therefore, following entry of this amendment claims 1-9, 11-15 and 17-21 will remain pending herein for which favorable action on the merits is solicited.

2. Response to Art-Based Rejections

The Examiner has withdrawn the indication of allowability and instead has now advanced a rejection under 35 USC §103(a) based on Sielcken et al (USP 5,495,041) in view of Drent 1 (WO 02/26690) and Drent 2 (USP 5,304,674). In this regard, the Examiner asserts that:

"It would have been obvious to one skilled in the art to (sic) at the time the claimed invention was made to use the known technique as disclosed in Sielcken et al and monitor the concentration level of the catalyst system as suggested by Dent (1) (sic, Drent (1)) and then tweak the process by adding to the catalyst system, a second and different phosphine ligand (second bidentate diphosphine ligand) to the processing phosphine ligand (first bidentate diphosphine

ligand) in a continuous process, as suggested by Dent (2) (sic, Drent (2)), prior to feeding the catalyst system into the reaction zone with the carbon monoxide and conjugated diene and obtain the desired results from the carbonylation reaction, to maintain the concentration level of the catalyst system to reduce the degradation path for the ligand.” (Official Action at page 6, ultimate paragraph bridging page 7.)

The Examiner concludes that:

“Therefore, using a known technique of adding a second and different phosphine ligand to [a] reaction process for carbonylation of a conjugated diene to reduce degradation in the catalyst system of Sielcken et al would have been obvious to one of ordinary skill in the art.” (Official Action at page 7, first fully paragraph.)

Applicants emphatically disagree.

At the outset, applicants note that Sielcken et al is relevant only as background art to the presently claimed invention. In this regard, Sielcken et al discloses carbonylation reactions with the use of a catalyst system comprising palladium, a carboxylic acid and a phosphine ligand, wherein the carboxylic acid is pentenoic acid (preferably in at least 10:1 molar ration to Pd).

The Examiner has on page 5, lines 4-9 of the Official Action noted several significant technical differences between Sielcken et al and the presently claimed invention. In order to cure such deficiencies in Sielcken et al, the Examiner then turns to Drent (1) and Drent (2) to support the rejection advanced under 35 USC §103(a).

Drent (1) is apparently being employed for its teaching of adding fresh diphosphine ligand to a catalyzed process. However, Drent (1) teaches very specific diphosphine ligands (in slight molar excess to Pd), in particular ones having (methyl) substituted dimethylene or trimethylene bridging groups. Thus the entire thrust of Drent (1) is with respect to the specific disclosed ligands and to ensure that such ligands are maintained in a molar ratio higher than the Pd as disclosed at page 14, lines 20-27 thereof. Moreover, Drent (1) even refers to Sielcken et al as part of its background art (see page 1, lines 13-26) and thus there would be no impetus to an ordinarily skilled person to combine such references in the manner suggested by the Examiner.

Drent (2) relates to the preparation of mixtures of mono- and diesters (the latter being alkanedioic derivatives) in a one-pot process using a mixture of catalysts. Specifically, the mixture of catalysts proposed by Drent (2) is such that one catalyst (i.e., the catalyst with the C₄ bridging group, for example BDPbut) produces mono-carbonylated products (i.e., the formed monoesters) while the other catalyst (i.e., the catalyst with the C₃ bridging group, for example BDiPP) introduces the second carbonyl group to form the diesters.

Significantly, in the process of the present invention, *even though combinations of ligands are employed*, a mixture of mono- and di-carbonylated compounds does not ensue. Instead, according to the present invention, only mono-carbonylated compounds are produced. This is particularly significant when consideration is given to the fact that combinations of ligands, notably even combinations of ligands with electron-withdrawing properties and ligands with electron-containing properties, may be used in accordance with the present invention.

The facts noted above underscore the *unobviousness* of the present invention. Specifically, it is noted that the Examiner's conclusion is based on a passage in *KSR*¹

¹ *KSR International Co. v. Teleflex Inc.*, 550 US at ___, 82 USPQ2d 1385 (US 2007).

that persons of ordinary skill in an art can implement a "predictable variation." Here however the evidence underscores the *unpredictability* of catalyst systems generally. Specifically, if addition of mixed phosphine ligands as disclosed by Drent (2) was in fact obvious in the carbonylation of a conjugated diene with carbon monoxide and a hydroxyl group-containing compound, then the formation of mixed mono- and di-carbonylated products would be the predictable result. That only mono-carbonylated compounds ensue with the practice of the present invention therefore evidences that what is claimed is not a "predictable variation" of the disclosure Drent (2).

For the reasons noted above, therefore, applicants suggest that the rejection advanced under 35 USC §103(a) is inappropriate against the presently pending claims. Withdrawal of such rejection is therefore in order.

3. Fee Authorization

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Account No. 14-1140.

Respectfully submitted,

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